

CLAIMS

1. A vehicle having a body suspended on one or more axles by means of gas-filled suspension units, the vehicle being provided with means to vary the pressure within the suspension units to control the spacing between the body and the axle or axles and a braking system supplying a brake fluid to braking actuators operable to brake the vehicle's wheels, and further comprising a load sensing valve operable to apply a variable throttling effect to impede the flow of brake fluid to the braking actuators, characterised by further comprising means to vary the throttling effect of the load sensing valve in dependance on the pressure within the gas-filled suspension units.

2. A vehicle according to claim 1, comprising a sensor for detecting the air pressure in the air suspension units, and control means responsive to the sensor output for varying the throttling effect of the load sensing valve.

3. A vehicle according to claim 1 or claim 2, wherein the load sensing valve includes a movable throttling element having a first position wherein a maximum

throttling effect is exerted, and a second position wherein a minimum throttling effect is exerted, and further comprises first actuating means to urge the throttling element toward its second position with a force dependant on the pressure in the gas-filled suspension units, and second actuating means to urge the throttling element toward its first position with a force dependant on the position of the throttling element and increasing as the throttling element approaches its second position.

4. A vehicle according to claim 3, wherein the first actuating means is a fluid actuator to which the pressure of the gas-filled suspension units is communicated.

5. A vehicle according to claim 3 or claim 4, wherein the first actuating means is an air bag.

6. A vehicle according to any of claims 3 to 5, wherein the second actuating means is a fluid actuator supplied with a controlled pressure.

7. A vehicle according to claim 6, wherein the second actuating means is an air bag.

8. A vehicle according to claim 6 or claim 7, further comprising a pressure regulator means for supplying a reference fluid pressure to the second actuating means.

5 9. A vehicle according to claim 8, wherein the pressure regulator means is capable of supplying a number of reference fluid pressures, the vehicle further comprising pressure sensing means operable to sense the pressure in the suspension units and control means operable to select one of said reference fluid pressures on the basis of the sensed pressure and to supply said selected reference fluid pressure to the second actuating means.

10 10. A vehicle according to claim 9, wherein the pressure regulator means is capable of supplying first and second reference pressures, and the pressure sensing means provides a first output when the sensed pressure is below a predetermined threshold and a second output when the sensed pressure is above the predetermined threshold, and the control means is operable to provide the first reference pressure to the second actuating means when the pressure sensing means provides the first output, and to provide the second reference pressure to the second actuating means when the pressure sensing means provides the second output.

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11. A vehicle according to any of claims 3 to 5, wherein the second actuator is a resilient element.

12. A vehicle according to claim 11 wherein the resilient element is a spring.

13. A vehicle according to claim 1 or claim 2, wherein the load sensing valve includes a movable throttling element having a first position wherein a maximum throttling effect is exerted, and a second position wherein a minimum throttling effect is exerted, and further comprises a positioning actuator operable to position the throttling element at a point between its first and second positions.

14. A vehicle according to claim 13, further comprising means for sensing the pressure within the gas-filled suspension units, and control means responsive to the sensed pressure to control the positioning actuator.

15. A vehicle according to claim 14, further including sensing means to detect the spacing between the body and the axle, wherein the control means controls the positioning actuator in dependence on detected spacing and on the pressure within the suspension units.

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16. A vehicle according to claim 14 or claim 15, wherein the control means comprises means to determine a desired position for the throttling means on the basis of the sensed pressure, and means to operate the positioning actuator to bring the throttling means to the desired position.

17. A vehicle according to any of claims 14 to 16, wherein the output of the pressure sensing means is an electrical signal.

18. A load sensing system for a braking system of a vehicle having a vehicle body supported on an axle by a pressurised air suspension unit whose pressure is varied as the vehicle load varies, the load sensing system comprising a variable throttling valve operable to control the flow of brake fluid to a brake actuator, and control means to vary the throttling effect of the throttling valve in dependence on the pressure in the air suspension unit.

19. A load sensing system according to claim 18 comprising a sensor for detecting the air pressure in the air suspension units, and control means responsive to the sensor output for varying the throttling effect of the

load sensing valve.

20. A load sensing system according to claim 18 or claim 19, wherein the variable throttling valve comprises a valve element movable between closed and open positions to vary the throttling effect, and a fluid pressure actuator responsive to the pressure in the suspension unit and operable to urge the valve element toward its open position against a restoring force.

21. A load sensing system according to claim 20, wherein the restoring force is provided by a second fluid pressure actuator.

22. A load sensing system according to claim 21, wherein the second fluid pressure actuator is supplied with fluid at a regulated pressure.

23. A load sensing system according to claim 21, wherein the second fluid pressure actuator is an air bag.

24. A load sensing system according to claim 22 or claim 23, further comprising a pressure regulator means for supplying a reference fluid pressure to the second actuating means.

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5 25. A load sensing system according to claim 24, wherein the pressure regulator means is capable of supplying a number of reference fluid pressures, the vehicle further comprising a pressure sensing means operable to detect the pressure in the suspension units and control means operable to select one of said reference fluid pressure on the basis of the sensed pressure and to supply said selected reference fluid pressure to the second actuating means.

10 26. A load sensing system according to claim 25, wherein the pressure regulator means is capable of supplying first and second reference pressures, and the pressure sensing means provides a first output when the sensed pressure is below a predetermined threshold and a second output when the sensed pressure is above the predetermined threshold, and the control means is operable to provide the first reference pressure to the second actuating means when the pressure sensing means provides the first output, and to provide the second reference pressure to the second actuating means when the pressure sensing means provides the second output.

20 27. A load sensing system according to claim 20, wherein
25 the restoring force is provided by a resilient element.

28. A load sensing system according to claim 27, wherein the restoring force is provided by a spring.

29. A load sensing system according to any of claims 20 to 28, wherein the restoring force increases as the valve element approaches its open position.

30. A load sensing system according to claim 19, wherein the pressure in the air suspension unit is sensed by an electrical or electromechanical sensor to provide an electrical output signal corresponding to the suspension unit pressure, and the variable throttling valve is electrically controllable to vary the flow of brake fluid to a brake actuator, and the control means comprises a control circuit varies the throttling effect of the throttling valve in dependence on the output signal from the pressure sensor.

31. A load sensing system according to claim 19, comprising a detector responsive to a spacing between the vehicle body and the axle, a sensor to give an electrical output corresponding to suspension unit pressure, and an electrically controllable throttling valve to vary the flow of brake fluid to a brake actuator, the control means providing control signals to the throttling valve

in dependence on the sensed suspension unit pressure and
the spacing between the vehicle body and axle.

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